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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/007,412	12/05/2001	Jeffrey D. Morse	IL-10634	4077
7590	12/17/2004			
Laboratory Counsel P.O. Box 808, L-703 Livermore, CA 94551			EXAMINER KERNS, KEVIN P	
			ART UNIT 1725	PAPER NUMBER

DATE MAILED: 12/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/007,412

Applicant(s)

MORSE ET AL.

Examiner

Kevin P. Kerns

Art Unit

1725

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 October 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3,6-10,13-27,29,30 and 32-41 is/are pending in the application.
- 4a) Of the above claim(s) 29,30 and 32-41 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3,6-10 and 13-27 is/are rejected.
- 7) ☒ Claim(s) 25 is/are objected to.
- 8) ☒ Claim(s) 1-3,6-10,13-27,29,30 and 32-41 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 October 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

DETAILED ACTION

Election/Restrictions

1. Applicants' election without traverse of Group I (claims 1-3, 6-10, and 13-27) in the reply filed on October 7, 2004 is acknowledged. Previously, the applicants elected Group I (formerly claims 1-28) with traverse on June 3, 2004.

Claim Objections

2. Claim 25 is objected to because of the following informalities: in the 2nd line, "the" should be changed to "fuel" before "flow" for agreement with claim 10, and to establish proper antecedent basis. Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 1-3, 6-10, and 13-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koripella et al. (US 6,569,553) in view of DE 198 41 993 (complete translation of the German text provided herein).

Koripella et al. disclose a fuel processor (microreactor with a reaction zone including a catalyst) with an integrated fuel cell, such that the microreactor fuel processor 10 includes a multilayer ceramic structure 12 (substrate) having a plurality of multi-directional flow microchannels with a fuel inlet 20 (combination fuel comprised of methanol and water from respective reservoirs 24,26) and a hydrogen enriched fuel outlet 22 for supplying fuel cell stack manifold 32; an integrated heater 28 along the length of the microchannels (either resistance or a catalytic microcombustion, or chemical, heater -- see claims 2-5 of reference) within the reaction zone 18 that includes a plurality of packed catalyst materials such as copper oxide and zinc oxide; and a multiplicity of parallel channels 61 with an inert porous ceramic material for thermal control, in communication with a porous diffuser 113 (membrane), or getter (abstract; column 2, lines 1-33 and 66-67; column 3, line 1 through column 6, line 12; claims; and Figures 1-8). With regard to the ranges of the fuel flow rates, as well as the surface areas of the catalysts and porous structures, one of ordinary skill in the art would have recognized that the ranges of fuel flow rates to supply fuel cells would necessarily be determined and optimized for appropriate functioning of the fuel cell, as a

minimum amount of fuel flow is proportional to a minimum fuel consumption needed for the fuel cell to adequately operate. Furthermore, the surface areas of the catalysts and porous structures would also need to be optimized by one of ordinary skill in the art to achieve adequate production of fuel flow from the chemical reaction, and would be inadequate if the surface areas were too low (lacking catalytic reaction sites). As a result, it would have been obvious to one of ordinary skill in the art at the time the applicants' invention was made to optimize the fuel flow rates and surface areas of the catalysts and porous structures, in order for the fuel production efficiency to be increased in supplying the fuel cell. Koripella et al. do not specifically disclose that the substrate would be silicon, rather than ceramic.

However, DE 198 41 993 discloses a microstructure reactor that includes microchannel structures 2 having inlets and outlets within a layer of a silicon substrate 3 that forms a plate 6 of silicon substrate, and a catalyst 1 packed between the inlets and outlets, with the microstructure reactor being heated with integrated resistance heaters, such that the use of a silicon substrate is advantageous for achieving precise manufacturing of silicon microstructures that carry out endothermic chemical reactions (abstract; pages 2, 3, and 5-12 of translation; and Figure).

It would have been obvious to one of ordinary skill in the art at the time the applicants' invention was made to modify the fuel processor (microreactor) having an integrated catalytic microcombustion (chemical) heater within a ceramic substrate, as disclosed by Koripella et al., by instead using a silicon substrate with integrated heaters, as taught by DE 198 41 993, in order to achieve precise manufacturing of silicon

microstructures that carry out endothermic chemical reactions (DE 198 41 993; abstract; page 2, 1st paragraph under Description; and the paragraph bridging pages 10 and 11 of translation).

Response to Arguments

6. The examiner acknowledges the applicants' amendment and replacement drawing sheets, both of which were received by the USPTO on October 7, 2004. The replacement drawing sheets, as well as amendments to the specification, overcome prior objections to the drawings. Prior objections to the abstract, specification, and claims have also been overcome by the applicants' amendments. However, an objection to claim 25 remains (see paragraph 2 above). The 35 USC 112 and 35 USC 102 rejections have also been overcome. The applicants have changed the status of their response to the election/restriction to without traverse in this communication (see paragraph 1 above). The applicants have cancelled claims 4, 5, 11, 12, and 28. Claims 29, 30, and 32-41 are drawn to non-elected inventions. Claims 1-3, 6-10, and 13-27 are currently under consideration in the application.

7. Applicants' arguments with respect to claims 1-3, 6-10, and 13-27 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Kevin P. Kerns whose telephone number is (571) 272-1178. The examiner can normally be reached on Monday-Friday from 8:00am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Dunn can be reached on (571) 272-1171. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Kevin P. Kerns *Kevin Kerns 12/13/04*
Examiner
Art Unit 1725

KPK
kpk
December 13, 2004